

scores. Finally, the ethnic composition of the group of students served by Title I/Chapter 1 is more similar to that of the student body as a whole than is the group served by Head Start; 45 percent of Chapter 1 students in 1984, and 54 percent of those served in the mid-1970s, were non-Hispanic whites (compared with 73 percent to 78 percent of the school-age population in those years).<sup>105/</sup> This greater similarity would ameliorate any effect of the program on disparities in test scores among ethnic groups.

Thus, Title I/Chapter 1 could have contributed measurably to the relative gains of black and Hispanic students, but probably only in the early grades. Although a precise estimate is impossible, Title I/Chapter 1 narrowed the gap between black and nonminority students in grade 4 by roughly 0.04 to 0.06 standard deviation and that between Hispanic and nonminority students by 0.02 to 0.05 standard deviation--a small effect in absolute terms, but a moderate share of the total relative gains of those groups.<sup>106/</sup> In the higher grades, however, the effect of the program would have been far smaller--perhaps even negligible--because of the much smaller percentage of students participating in the program in those grades, the lesser impact of the program on older students, and the apparent lack of persistence of effects on younger program participants.

Finally, Title I/Chapter 1 could have made a minor contribution to the relatively favorable trends in the youngest children because of the small number of students served by the program in the higher grades. It is plausible, for example, that Title I/Chapter 1 might have raised aggregate scores in the first four grades by roughly 0.025 standard deviation relative to scores in the twelfth grade. Such an effect, however, would be an order of magnitude smaller than the observed difference in trends among the youngest and oldest children.

### Desegregation

Some observers have suggested that the relative gains of certain minority students might in part reflect the effects of desegregation. To evaluate this

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105. The 1984 Chapter 1 estimate reflects data provided by the Department of Education. The mid-1970s Title I estimate is from National Institute of Education, *Compensatory Education Services* (Washington, D.C.: Department of Health, Education, and Welfare, July 1977), Table 2. Estimates of the composition of the school-age population are based on CBO tabulations of the Current Population Survey.

106. For present purposes, the most important weakness of the existing data is the absence of research distinguishing the program's effects among different ethnic groups. These estimates assume that the effect of the program is the same regardless of ethnicity.

hypothesis, it is necessary to distinguish between the relative gains of black and Hispanic students because of different trends in segregation experienced by the two groups.

Black Students. Research on the effects of desegregation on the test scores of black students is plentiful but inconsistent. Some inconsistency should probably be expected; the effects of desegregation presumably would differ among locations, depending on the characteristics of the communities, schools, nonminority students, and black students involved.

A recent synthesis of research concluded that, in the aggregate, desegregation probably increased the reading scores of black students. Quantifying that gain proved difficult, however, because the estimate varied greatly depending on the technical criteria used to decide which studies were of sufficiently high quality to be credible. The review concluded that the gains of directly affected black students were probably in the range of 0.06 to 0.16 standard deviation, although some studies suggested that the upper bound of the estimate should be higher--about 0.26 standard deviation. In mathematics, on the other hand, the effect of desegregation, if any, appeared trivial. 107/

The contribution of desegregation to the relative gains of black students in the aggregate, however, would have been considerably smaller than the gains of directly affected students, because for many black students the amount of segregation experienced did not change markedly. That is, even though the amount of desegregation between the late 1960s and the present has been substantial, a sizable share of black students remain in segregated environments. In addition, some black students were in desegregated environments before desegregation began.

The results of research on desegregation are also somewhat inconsistent with the observed relative gains of black students in the aggregate. Those gains were not limited to reading; indeed, some tests showed greater

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107. Thomas D. Cook, "What Have Black Children Gained Academically From School Integration?: Examination of the Meta-Analytic Evidence," in Thomas D. Cook, David Armor, Robert Crain, Norman Miller, Walter Stephan, Herbert Walberg, and Paul Wortman, *School Desegregation and Black Achievement* (Washington, D.C.: Department of Education, May 1984). This article reviewed and synthesized the results of a number of other syntheses of individual studies and examined the factors that might account for varying estimates among reviews.

gains in mathematics. This finding suggests that if the research is correct in showing at most a trivial effect of desegregation on achievement in mathematics, desegregation's direct effects leave much of the relative gains of black students unexplained.

Gauging the temporal consistency of desegregation and the relative achievement gains of black students is problematic, for it is not apparent what point in students' school careers to align with changes in segregation. Nationally, desegregation occurred primarily before 1971 or 1972. The proportion of black students attending predominantly minority schools (schools with minority enrollments over 50 percent) declined from 77 percent in 1968 to 64 percent in 1972. In contrast, the decline over the next eight years was negligible--to 63 percent. The proportion of black students attending schools with minority enrollments of 90 percent or more showed a similar trajectory, declining from 64 percent in 1968 to 39 percent in 1972 and 33 percent in 1980.<sup>108/</sup> A similar pattern emerged in a study of the degree of within-district segregation of black and nonminority students in 116 central-city school districts.<sup>109/</sup>

Thus, little desegregation occurred during the years when black students were gaining on achievement tests relative to their nonminority peers. But if segregation in the early years of schooling is especially important, trends in desegregation would nonetheless be temporally consistent with some of the relative achievement gains of black students. For example, the most recent analysis of NAEP reading trends shows that the largest relative gains of black students occurred among those in the cohorts born roughly between 1961 and 1967--the cohorts that entered school during

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108. Gary Orfield, *Working Paper: Desegregation of Black and Hispanic Students From 1968 to 1980* (Washington, D. C.: Joint Center for Political Studies, 1982), Table 11.

109. Reynolds Farley, "Trends in School Segregation and Enrollment by Race: An Analysis of New Data From the Office of Civil Rights" (University of Michigan Population Studies Center, Ann Arbor, unpublished final report to the National Institute of Education, October 1981). This report measured segregation differently: it assessed disparities in the racial mix of schools within a district. By this measure, a district in which all minority students attended schools with a high percentage of minority students would nonetheless be considered fully desegregated if the ethnic mix was identical in all schools. This measure, which is entirely insensitive to changes in the composition of the student body resulting from factors such as declining nonminority enrollments, is relevant in many legal contexts. When considering the effects of desegregation on achievement, however, it is likely that the relevant indices are those--such as Orfield's--that measure the composition of the schools attended by minority students, regardless of the causes of that composition.

the years of most rapid desegregation.<sup>110/</sup> Similarly, the relative gains of students on the SAT were apparent by the time of the cohort that entered first grade in 1965 and appear to have ended after the cohorts that entered in 1970 and 1971. On the other hand, statewide data from North Carolina and Texas show relative gains by black students in later cohorts.

Hispanic Students. The relative achievement gains of Hispanic students, unlike those of black students, clearly did not stem from desegregation. During the period for which data are available, Hispanic students became more segregated, not less. In 1968, 55 percent of Hispanic students attended schools with predominantly minority enrollments; 23 percent were in schools with minority enrollments of 90 percent or more. By 1980, those proportions had risen to 68 percent and 29 percent, respectively.<sup>111/</sup>

## SELECTION FACTORS

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This section explores two types of selection changes: trends in the proportion of students remaining enrolled in school (retention) and changes in the proportion of students choosing to take college admissions tests (self-selection). Several other aspects of selection, such as changes in the enrollment of certain types of handicapped students and in the policies governing the participation of handicapped students or students with limited proficiency in English in routine testing programs, are not discussed because appropriate data are not available.<sup>112/</sup>

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110. National Assessment of Educational Progress, *The Reading Report Card*, Figure 3.1.
  111. Orfield, *Desegregation of Black and Hispanic Students from 1968 to 1980*. Similarly, from 1970 to 1980, the average minority enrollment in schools attended by Hispanic students rose from 56 percent to 64 percent. Another study reported a modest decline in the segregation of Hispanic students during the late 1960s and early 1970s in 44 central city school districts with Hispanic enrollments of at least 5 percent (Farley, *Recent Trends in School Segregation*, pp. 32-34). As noted earlier, however, such a measure is probably not germane to the effects of desegregation on test scores.
  112. Selection changes have often been subsumed in the broader category of changes in the composition of the test-taking group. Compositional changes stemming from selection changes, however, have very different implications from those reflecting changes in the characteristics of the school-age population. For that reason, changes in the ethnic composition of the group tested that can be considered selection changes are discussed here rather than with changes in the ethnic composition of the entire cohort (discussed above under societal factors).

## Retention

Although changes in retention have often been cited as having contributed to the decline in achievement, they had little or no direct role during much of the period of the decline (from about 1968 to the end of the 1970s). Earlier sizable increases in retention, however, could have contributed indirectly to the decline. One hypothesis, for example, holds that schools might have gradually lessened academic demands during the 1970s in response to the earlier increases in retention and that this "pedagogical echo" continued to contribute to the decline of test scores for years after the retention changes themselves ended.<sup>113/</sup> Retention changes also did not contribute appreciably to the rise in test scores and may have impeded it slightly in some instances.

Achievement trends among students under age 16 have been largely unaffected by changes in retention because of mandatory attendance laws.<sup>114/</sup> The issue is the extent to which trends in achievement among older students--primarily high school juniors and seniors--can be attributed to such changes. Thus, the most relevant available measures of changes in retention are the proportion of 16- and 17-year-olds enrolled in school below the college level, and the proportion of youth in each of those age groups enrolled in the modal grade for their age (that is, 16-year-olds enrolled as juniors, and 17-year-olds enrolled as seniors). To the extent that testing is linked to grade rather than age, the latter measure is superior.<sup>115/</sup>

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113. William W. Turnbull, *Student Change, Program Change: Why SAT Scores Kept Falling* (New York: College Entrance Examination Board, 1985).
114. Retention rates have not been constant in earlier grades, but the changes have been much smaller than in the higher grades. For example, between the cohorts that entered fifth grade in 1954 and 1964, the retention rate increased by almost 11 percentage points in the eleventh and twelfth grades but by only 3 percentage points in the eighth grade. National Center for Education Statistics, *Digest of Education Statistics, 1982* (Washington, D.C.: Department of Education, 1981), Table 9.
115. The relevant data reflect students' ages in October, so most students graduating at the age of 18 and all graduating at the age of 17 are included in the category of 16- and 17-year-olds enrolled below the college level.

The more familiar graduation and dropout rates are less germane. For most tests (excluding graduation "exit" exams), the most important consideration is whether the student is present to be tested, not whether he or she graduates.

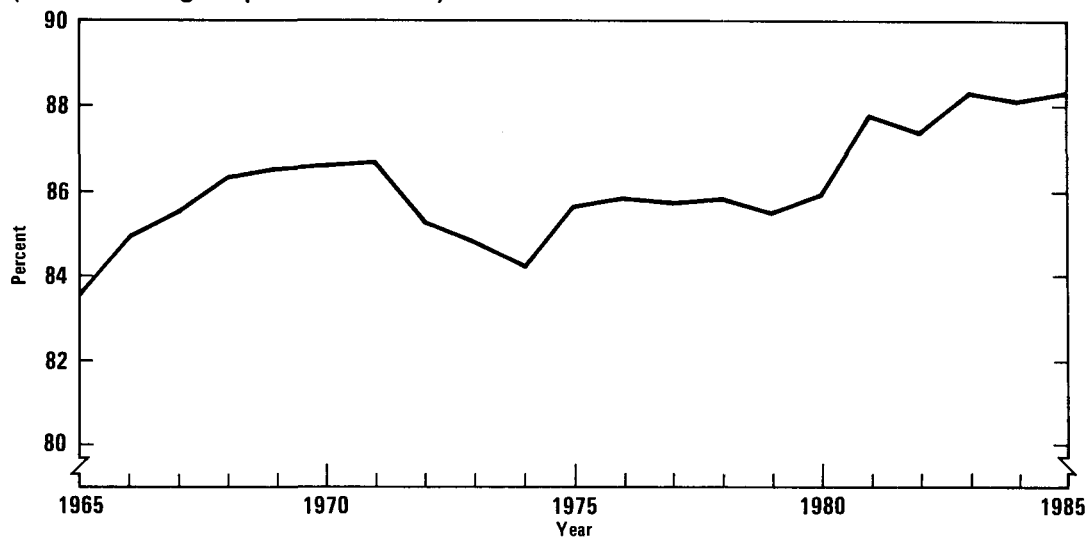
The Decline in Test Scores. Among all ethnic and racial groups, the proportion of 16- and 17-year-olds enrolled showed some fluctuations but little net change between 1968 and 1979--the end of the achievement decline among students of that age (see Figure A-3). In contrast, retention had increased sharply from 1950 to the late 1960s.<sup>116/</sup> It then increased slightly in the late 1960s. This upturn was followed by a short-lived dip in retention, after which the rate remained at about its 1967 level until 1979.<sup>117/</sup>

Modal-grade enrollment trends are largely consistent with the overall enrollment of 16- and 17-year-olds. Enrollment of 17-year-olds as high school seniors rose considerably some time between 1964 and 1969, although the form of the available data--a single average for 1964, 1965, and 1966, and annual data beginning in 1969--make it impossible to pinpoint more precisely when that increase occurred (see Figure A-4).<sup>118/</sup> That rise in enrollment antedated much of the achievement decline. The increase eroded quickly, however, and enrollment then vacillated slightly until the end of the 1970s.

The enrollment of 16-year-olds as high school juniors was slightly more consistent with trends in test scores, since there were hints of an enrollment increase during the latter 1970s--the final years of declining scores in that age group (see Figure A-4). This increase, however, was

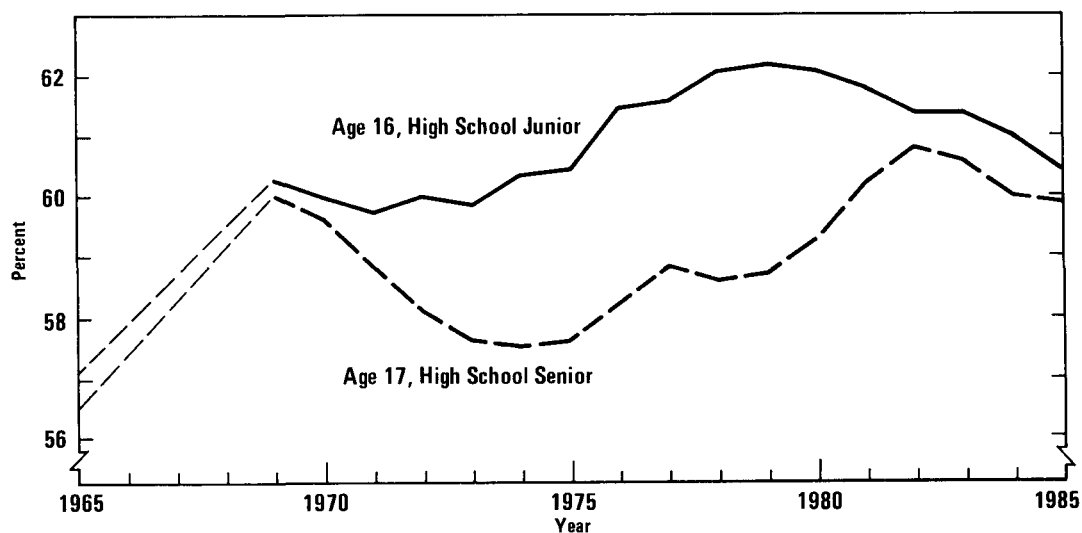
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116. The measure of retention available for this earlier period is somewhat different: the proportion of those enrolled in grade five who remain enrolled until grade twelve--or graduate--seven years later. These proportions increased markedly until the fall of 1968 but showed little change after 1968. (National Center for Education Statistics, *Digest of Education Statistics, 1982*, Table 9.)
117. In contrast, the retention rate among black students increased, though erratically and only modestly, between 1967 and 1979--from 83 percent to 87 percent. Given that black students comprised only about 14 percent of the age group in 1979, however, this small change in their retention rate would have contributed only trivially to the test score decline in the age group as a whole.
118. Annual data before 1969 are not currently available (Paul Siegel, Bureau of the Census, personal communication, May 1987).

Figure A-3.  
Percent of 16- and 17-Year-Olds Enrolled Below College Level  
(All ethnic groups combined)



SOURCE: Bureau of the Census, *School Enrollment: Social and Economic Characteristics of Students*, Series P-20 (Washington, D.C.: U.S. Department of Commerce, various years).

Figure A-4.  
Percent of Age Group in Modal Grade (Three-year moving averages)



SOURCE: Congressional Budget Office calculations based on Bureau of the Census, *School Enrollment: Social and Economic Characteristics of Students*, Series P-20 (Washington, D.C.: U.S. Department of Commerce, various years) and unpublished data.

NOTE: 1969 value is for single year. No data are available for 1966 through 1968.

trivial and erratic until the last few years of declining scores, and even in its entirety would have had only a slight effect on average test scores. 119/

The Subsequent Rise in Scores. Evidence about retention trends since the late 1970s, when test scores started rising in the senior high grades, is less consistent, but it is nonetheless clear that retention did not contribute appreciably to the rise.

Overall pre-college enrollment of 16- and 17-year-olds has risen modestly--about three percentage points--since the late 1970s (see Figure A-3). Because students at risk of dropping out generally are low achievers, this trend suggests that the recent upturn in test scores among high school students might have been slightly larger if the increase in retention had not occurred.

Recent trends in modal-grade enrollments are somewhat different but also do not indicate a major contribution to the rise in test scores. The proportion of 17-year-olds enrolled as seniors rose after 1978, fell a bit after 1982, but remained higher in 1985 than in 1978 (see Figure A-4). If this slight change had any effect, it would have impeded the rise in scores very slightly. The proportion of 16-year-olds enrolled as juniors has fallen since 1979, but the drop was so small that it could have contributed only slightly to the rise in scores in that grade.

### Self-Selection

Changes in the self-selection of students pertain only to college admissions tests such as the SAT and the ACT, but it is an important factor because these tests are among the most salient in the debate about educational achievement. Furthermore, these changes contributed substantially to the decline in both SAT and ACT scores, thereby exaggerating the deterioration of overall achievement. 120/

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119. For example, between 1972 and 1978, the proportion of 16-year-olds enrolled in the modal grade increased from 60 percent to 62.1 percent. If one assumes that the students newly retained scored on average a full standard deviation below the mean of other students, the effect of this change would be to lower the overall average test score by about 0.02 standard deviation.

120. Advisory Panel on the Scholastic Aptitude Test Score Decline, *On Further Examination* (New York: College Entrance Examination Board, 1977); L. A. Munday, *Declining Admissions Test Scores* (Iowa City: The American College Testing Program, 1976).

The effects of self-selection on SAT scores have been particularly well evaluated. The extent of these effects during part of the decline (until 1971) was estimated in one study by comparing the reading comprehension of nationally representative samples of high school seniors and college entrants to those of students taking the SAT.<sup>121/</sup> This study offered two different estimates of the impact of selection. Both estimates indicated that selection--in this instance, the growing number of less able students choosing to take the test--roughly doubled the apparent size of the decline among students taking the SAT during those years. It exaggerated the drop in scores on the SAT-Verbal by about 75 percent and the decline in the reading comprehension scores of students taking the SAT by about 125 percent (see Table A-2).<sup>122/</sup>

The continuing decline of SAT scores after 1971, however, probably was not caused by changes in self-selection. Between 1971 and 1976--that is, until just a few years before SAT scores stopped declining--the proportion of high school graduates taking the test fell slightly (see box, Chapter II). This decrease should have made the test-taking group more select and thus would have worked against the continuing decline in scores. The proportion of test-takers classifying themselves as white declined, but that drop paralleled the corresponding growth in the nonminority share of the high school cohort as a whole, indicating that the growth in the

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121. Albert E. Beaton, Thomas L. Hilton, and William B. Schrader, *Changes in the Verbal Abilities of High School Seniors, College Entrants, and SAT Candidates between 1960 and 1972* (New York: College Entrance Examination Board, June 1977). The estimates given here reflect selection changes affecting students taking the SAT above and beyond those that affected the student population as a whole (such as trends in retention). This discussion thus differs from certain other assessments of SAT trends that consider both types of selection changes together and estimate a larger impact of "compositional" changes on SAT scores during the early years of the decline. (Compare Advisory Panel on the Scholastic Aptitude Test Score Decline, *On Further Examination*, Part Three.)
  122. The exaggeration of the SAT decline by selection was partially offset by "scale drift"--a gradual lessening of the SAT's difficulty caused by inadvertent errors of equating--that moderated the total decline in scores. The estimates here reflect the extent to which the observed decline--augmented by selection but diminished by scale drift--overstated the true drop attributable to ability changes. The underlying effect of selection (which would be apparent if the errors of equating were corrected) is considerably larger but is not relevant here. The greater impact of selection on reading comprehension scores, in comparison to SAT scores, might in part reflect the lack of scale drift on the reading comprehension test.

TABLE A -2. TRENDS IN SAT-VERBAL SCORES AND READING COMPREHENSION AMONG ALL HIGH SCHOOL SENIORS, AND SAT CANDIDATES, 1959 TO 1971

Test	Group	Decline (In standard deviations)
SAT-Verbal		
Observed total decline <u>a/</u>	Students taking the SAT	.19
Change in ability only <u>b/</u>	Students taking the SAT	.11
Reading Comprehension	All seniors	.16
	Students taking the SAT	.36

SOURCE: Adapted from Albert E. Beaton, Thomas L. Hilton, and William B. Schrader, *Changes in the Verbal Abilities of High School Seniors, College Entrants, and SAT Candidates Between 1960 and 1972* (New York: College Entrance Examination Board, June 1977).

NOTE: The years 1960 and 1972 in the cited source refer to the springs of those years; the labels on this table refer to the 1959-1960 and 1971-1972 school years for consistency with other cited sources.

- a. In the study sample only. The national decline was 0.21 standard deviation.
- b. Estimate of score change after removing the effects of both selection and scale drift.

nonminority share of students taking the SAT did not represent a change in self-selection. <sup>123/</sup>

Changes in self-selection also appear not to account for the recent upturn in SAT scores; indeed, they might have impeded it, perhaps substan-

123. Since the Student Descriptive Questionnaire on which these estimates are based includes "Mexican-American" and "Puerto Rican" as explicit choices, the "white" category can be considered non-Hispanic white and thus corresponds closely to the nonminority category used here as a comparison.

tially. Since 1976, the proportion of graduates taking the test has risen sharply (see box, Chapter II). This increase probably made the test-taking group less select and therefore probably hindered the rise in average scores. Changes in the ethnic mix of the test-taking group since scores began rising--which reflect both self-selection and trends in the composition of the cohort as a whole--also probably made no substantial contribution to the rise in average scores. For example, the slight and erratic decline in the share of black students in the test-taking group, which represents a trend in self-selection, most likely accounts for roughly 0.2 points of the rise in average scores between 1979 and 1984--well under half a percent of the total increase.

